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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,378	08/20/2003	Scott Milton Fry	TUC920030083US1	6135
45216	7590	06/07/2007		
Kunzler & McKenzie 8 EAST BROADWAY SUITE 600 SALT LAKE CITY, UT 84111			EXAMINER COUGHLAN, PETER D	
			ART UNIT 2129	PAPER NUMBER
			MAIL DATE 06/07/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/644,378

Applicant(s)

FRY ET AL.

Examiner

Peter Coughlan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7, 13, 18-25 and 27-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 13, 18-25 and 27-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>A</u> . | 6) <input type="checkbox"/> Other: _____  |

## **Detailed Action**

1. This office action is in response to an AMENDMENT entered April 16, 2007 for the patent application 10/644378 filed on August 20, 2003.
2. The First Office Action of December 14, 2006 is fully incorporated into this Final Office Action by reference.

## ***Status of Claims***

3. Claims 1-7, 13, 18-25, 27-40 are pending.
4. Applicant cancelled claims 8, 14 and 26. Claims 9-12 are dependent on claims 8 and thus not addressed in this office action. Claims 15-17 are dependent on claim 14 and thus not addressed in this office action.

***Specification Objection***

5. The specification is objected to using natural language as inputs, outputs or variables depends on the users knowledge or use of the language to interpret the results. For example in ¶0112 of the application, the results of a temporary error rate could be 'pretty bad', 'not very marginal' or 'not good.' So the question is what is worst, 'not good' or 'not very marginal' if the values to these variables are not known? Claims 1, 18, 30, 36 use the term 'natural language'.

***35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-40 are rejected under 35 U.S.C. 101 for nonstatutory subject matter.

The computer system must set forth a practical application of that § 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77. The invention is ineligible because it has not been limited to a substantial practical application. A software program that simply predicts when a storage device is going to fail is not a practical application. The result has to be a practical application. Please see

the interim guidelines for examination of patent applications for patent subject matter eligibility published November 22, 2005 in the official gazette.

In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101. There is no real world purpose of function of this invention. It can only predict when a storage device is going to fail. What one does in a real world setting with such knowledge might lead to a practical application. As stated in the claims and specification, the invention is a model of storage device failure and nothing more.

The invention must be for a practical application and either:

- 1) specify transforming (physical thing) or
- 2) have the FINAL RESULT (not the steps) achieve or produce a useful (specific, substantial, AND credible), concrete (substantially repeatable/ non-unpredictable), AND tangible (real world/ non-abstract) result.

A claim that is so broad that it reads on both statutory and non-statutory subject matter, must be amended, and if the specification discloses a practical application but the claim is broader than the disclosure such that it does not require the practical application, then the claim must be amended.

Claims that recite a mathematical model for storage device failure without a practical purpose or function lacks a practical application. There must be a result that is a practical application.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 13, 18, 21, 25, 30, 32, 36 are rejected under 35 U.S.C. 102(a) (hereinafter referred to as **Awadallah**) being anticipated by Awadallah, 'Application of AI tools in fault diagnosis of electrical machines and drives-an overview.'

**Claim 1**

Awadallah teaches an editor to assist a user in generating a failure prediction algorithm comprising fuzzy logic rules, the failure prediction algorithm stored in a natural language format (**Awadallah**, abstract, C17:30-46, Figure 3; Per the application specification in ¶0102, 'fuzzy logic is based on natural language.' 'Fuzzy logic' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah. The 'user' has access to the system via item 311 in Figure 3.) a code generator to generate

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machine-readable code from the stored failure prediction algorithm in response to a user input (**Awadallah**, C7:36 through C8:9, p245, C1:18 through C2:21; 'Generate machine readable code' of applicant is produced by the 'computer simulations' of Awadallah.); a test module to test the machine-readable code with sample data to produce a result in response to a user input (**Awadallah**, p249, C1:20-21;; 'Test module' of applicant is equivalent to 'training' of Awadallah.); and a revision module to allow revisions of the failure prediction algorithm in response to a user input such that the result corresponds to an expected result. (**Awadallah**, p249, C1:29-48; 'Allow revisions' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

### Claim 3

Awadallah teaches the test module further tunes the failure prediction algorithm by adjusting a fuzzy variable definition in response to a user input. (**Awadallah**, p249, C1:29-48; 'Tune the failure prediction algorithm' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

### Claim 13

Awadallah teaches a controller to control and manage data transactions with a host (**Awadallah**, abstract, p245, C1:18 through C2:21; To run a 'computer simulation' of Awadallah, a processor is assumed. A 'controller' of applicant is equivalent to the processor which runs the 'computer simulation.');

a communication module to exchange data between the host and a storage media (**Awadallah**, abstract, p245, C1:18 through

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C2:21; In order to run a computer simulation or experimental testing there needs to be an medium between the interface and the computer or a 'communication module.' If there wasn't, the information regarding the 'computer simulation' would write itself and run itself without any input.) ; a drive mechanism to read data from the storage media and write data to the storage media (**Awadallah**, p245, C1:18 through C2:21; Computers that can generate 'computer simulations' have a mechanism to transfer data to and from a media storage device to a processor due to the fact the processor has little memory to work with at any given time.) ; and an analysis module to execute machine-readable code programmed to selectively predict failure of the storage media (**Awadallah**, p247, C1:21 through C2:6; 'Analysis module' of applicant is equivalent to the formula of '  $i_d$  at 2sf was an effective index to predict broken bar faults' of Awadallah. ) and the drive mechanism in response to a result from a failure prediction algorithm comprising fuzzy logic rules and performance data associated with the storage media and the drive mechanism. (**Awadallah**, abstract, C17:30-46; 'Fuzzy logic' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah. 'Failure prediction algorithm' of applicant is equivalent to 'fault diagnosis and prediction' of Awadallah.) the machine-readable code further comprises an interface to selectively adjust a fuzzy variable definition to tune the failure prediction algorithm in response to user input. (**Awadallah**, p249, C1:29-48; 'Adjust a fuzzy variable definition' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

Claim 18



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Awadallah teaches generating a failure prediction algorithm comprising fuzzy logic rules, the failure prediction algorithm stored in a natural language format (**Awadallah**, abstract, C17:30-46; 'Fuzzy logic' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah. 'Failure prediction algorithm' of applicant is equivalent to 'fault diagnosis and prediction' of Awadallah. Per the application specification in ¶0102, 'fuzzy logic is based on natural language.');

generating machine-readable code from the stored failure prediction algorithm (**Awadallah**, p245, C1:18 through C2:21; When any application, for example, fuzzy and adaptive fuzzy systems are implemented on a computer, when employed, this application is converted into machine code in which the processor can process. This conversation of any application into machine code for use within a computer is common knowledge within the art and is equivalent to 'machine readable code' of applicant.); testing the machine-readable code to produce a result (**Awadallah**, p245, C1:18 through C2:21; 'Testing' of applicant is equivalent to 'experimental testing' of Awadallah.) ; and selectively revising the failure prediction algorithm such that the result corresponds to an expected result. (**Awadallah**, p249, C1:29-48; 'Selective revising' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

#### Claim 21

Awadallah teaches tuning the failure prediction algorithm by adjusting a fuzzy variable definition. (**Awadallah**, p249, C1:29-48; 'Tuning the failure prediction algorithm' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

Claim 25

Awadallah teaches gathering performance data for a storage system (**Awadallah**, abstract; 'Performance data' of applicant is equivalent to 'condition monitoring' of Awadallah.) executing a failure prediction algorithm on the performance data to produce a result, the failure prediction algorithm comprising fuzzy logic rules (**Awadallah**, abstract; 'Failure prediction algorithm' of applicant is equivalent to 'fault diagnosis and prediction' of Awadallah. 'Fuzzy logic rules' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah.); and tuning the failure prediction algorithm by adjusting a fuzzy variable definition. (**Awadallah**, p249, C1:29-48; 'Adjust a fuzzy variable definition' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.) selectively forecasting failure of one or more components of the storage system in response to the result. (**Awadallah**, p247; C1:21 through C2:6; 'Forecasting failure' of applicant is equivalent to the formula of 'i<sub>d</sub> at 2sf was an effective index to predict broken bar faults' of Awadallah.)

Claim 30

Awadallah teaches means for generating a failure prediction algorithm comprising fuzzy logic rules, the failure prediction algorithm stored in a natural language format (**Awadallah**, abstract, C17:30-46, Figure 3; Per the application specification in ¶0102, 'fuzzy logic is based on natural language.' 'Fuzzy logic' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah. 'Failure prediction

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algorithm' of applicant is equivalent to 'fault diagnosis and prediction' of Awadallah.); means for generating machine-readable code from the stored failure prediction algorithm (**Awadallah**, p245, C1:18 through C2:21; When any application, for example, fuzzy and adaptive fuzzy systems are implemented on a computer, when employed, this application is converted into machine code in which the processor can process. This conversation of any application into machine code for use within a computer is common knowledge within the art and is equivalent to 'machine readable code' of applicant.); means for testing the machine-readable code to produce a result (**Awadallah**, p245, C1:18 through C2:21; 'Testing' of applicant is equivalent to 'experimental testing' of Awadallah.); means for selectively revising the failure prediction algorithm such that the con result corresponds to an expected result. (**Awadallah**, p249, C1:29-48; 'Revising the failure prediction algorithm' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

#### Claim 32

Awadallah teaches means for tuning the failure prediction algorithm by adjusting a fuzzy variable definition. (**Awadallah**, p249, C1:29-48; 'Adjust a fuzzy variable definition' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

#### Claim 36

Awadallah teaches generating a failure prediction algorithm comprising fuzzy logic rules, the failure prediction algorithm stored in a natural language format

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(**Awadallah**, abstract, C17:30-46, Figure 3; Per the application specification in ¶0102, 'fuzzy logic is based on natural language.' 'Fuzzy logic' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah. 'Failure prediction algorithm' of applicant is equivalent to 'fault diagnosis and prediction' of Awadallah.); generating machine-readable code from the stored failure prediction algorithm (**Awadallah**, p245, C1:18 through C2:21; When any application, for example, fuzzy and adaptive fuzzy systems are implemented on a computer, when employed, this application is converted into machine code in which the processor can process. This conversation of any application into machine code for use within a computer is common knowledge within the art and is equivalent to 'machine readable code' of applicant.); testing the machine-readable code to produce a result (**Awadallah**, p245, C1:18 through C2:21; 'Testing' of applicant is equivalent to 'experimental testing' of Awadallah.) selectively revising the failure prediction algorithm such that the result corresponds to an expected result. (**Awadallah**, p249, C1:29-48; 'Revising the failure prediction algorithm' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the

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subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 6, 19, 20, 24, 31, 35, 37, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awadallah in view of Preston. (U. S. Patent 6446081, referred to as **Preston**)

#### Claim 2

Awadallah does not teach linguistic variables having less than four terms.

Preston teaches linguistic variables having less than four terms. (**Preston**, C6:34-64; 'Less than four items' of applicant is equivalent to 'nouns, verbs and adjectives' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by having only 3 terms for input as taught by Preston to have linguistic variables having less than four terms.

For the purpose of keeping conditional statements down to a manageable size.

#### Claim 6

Awadallah teaches the fuzzy logic rules are defined by conditional statements.

(**Awadallah**, p249, C1:29-48; 'Conditional statements' of applicant is equivalent to 'if-then statements' of Awadallah.)

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Preston teaches that include subjects, adjectives, and verbs familiar to personnel in the storage system field. (**Preston**, C6:34-64; 'Subjects, adjectives and verbs' of applicant is equivalent to 'nouns, verbs and adjectives' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using natural language terms as taught by Prestonto have subjects, adjectives, and verbs familiar to personnel in the storage system field.

For the purpose of using a users natural language for input variables to lower the learning curve of the invention.

#### Claim 19

Awadallah does not teach the fuzzy logic rules comprise linguistic variables having less than four terms.

Preston teaches the fuzzy logic rules comprise linguistic variables having less than four terms. (**Preston**, C6:34-64; 'Less than four items' of applicant is equivalent to 'nouns, verbs and adjectives' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by having a small number in inputs as taught by Preston to have the fuzzy logic rules comprise linguistic variables having less than four terms.

For the purpose of having a small number in inputs allows the conditional fuzzy logic rules to be a manageable size.

Claim 20

Awadallah does not teach wherein certain linguistic variables comprise less than three terms.

Preston teaches wherein certain linguistic variables comprise less than three terms. (**Preston**, C6:34-64; 'Less than three items' of applicant is equivalent to 'nouns and verbs' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by having a small number of inputs as taught by Preston to have wherein certain linguistic variables comprise less than three terms.

For the purpose of having a small number in inputs allows the conditional fuzzy logic rules to be a manageable size.

Claim 24

Awadallah does not teach the fuzzy logic rules are defined by conditional statements that include subjects, adjectives, and verbs familiar to personnel in the storage system field.

Preston teaches the fuzzy logic rules are defined by conditional statements that include subjects, adjectives, and verbs familiar to personnel in the storage system field. (**Preston**, C6:34-64; 'Subjects, adjectives and verbs' of applicant is equivalent to 'nouns, verbs and adjectives' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using linguistics terms as taught by Preston to have the fuzzy logic

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rules are defined by conditional statements that include subjects, adjectives, and verbs familiar to personnel in the storage system field.

For the purpose of using the natural language of the user for ease of use to define conditional statements.

#### Claim 31

Awadallah does not teach the fuzzy logic rules comprise linguistic variables having less than four terms.

Preston teaches the fuzzy logic rules comprise linguistic variables having less than four terms. (**Preston**, C6:34-64; 'Less than four items' of applicant is equivalent to 'nouns, verbs and adjectives' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using 3 variables as taught by Preston to have the fuzzy logic rules comprise linguistic variables having less than four terms.

For the purpose of keeping the conditional statements down to a manageable size.

#### Claim 35

Awadallah does not teach the fuzzy logic rules are defined by conditional statements that include subjects, adjectives, and verbs familiar to personnel in the storage system field.



Preston teaches the fuzzy logic rules are defined by conditional statements that include subjects, adjectives, and verbs familiar to personnel in the storage system field. (**Preston**, C6:34-64; 'Subjects, adjectives and verbs' of applicant is equivalent to 'nouns, verbs and adjectives' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using linguistics terms for variables as taught by Preston to have the fuzzy logic rules are defined by conditional statements that include subjects, adjectives, and verbs familiar to personnel in the storage system field.

For the purpose of using the natural language of the user to make it easier for the user to implement the invention.

#### Claim 37

Awadallah does not teach the fuzzy logic rules B comprise simple conditional statements that include subjects, adjectives, and verbs that are commonly used to describe error conditions of a storage system.

Preston teaches the fuzzy logic rules B comprise simple conditional statements that include subjects, adjectives, and verbs that are commonly used to describe error conditions of a storage system. (**Preston**, C6:34-64; 'Subjects, adjectives and verbs' of applicant is equivalent to 'nouns, verbs and adjectives' of Preston.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using if-then statements along with natural language variables as taught by Preston to have the fuzzy logic rules B comprise simple

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conditional statements that include subjects, adjectives, and verbs that are commonly used to describe error conditions of a storage system.

For the purpose of natural language variables to ease the implementation of the conditional statements.

#### Claim 38

Awadallah teaches tuning the failure prediction algorithm by adjusting a fuzzy variable definition. (**Awadallah**, p249, C1:29-48; 'Adjust a fuzzy variable definition' of applicant is equivalent to 'adjust the system parameter set' of Awadallah.)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 23, 29, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awadallah in view of Heller. (U. S. Patent 4907230, referred to as **Heller**)

Claim 5

Awadallah does not teach the revision module comprises a text editor configured to revise the failure prediction algorithm.

Heller teaches the revision module comprises a text editor configured to revise the failure prediction algorithm. (**Heller**, C23:43-48; 'Text editor' of applicant is equivalent to 'text editor' of Heller.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using a text editor as taught by Heller to have the revision module comprises a text editor configured to revise the failure prediction algorithm.

For the purpose of reducing the learning curve for the user due to the fact that text editors are established and known software.

Claim 23

Awadallah does not teach revising the failure prediction algorithm by way of a text editor.

Heller teaches revising the failure prediction algorithm by way of a text editor. (**Heller**, C23:43-48; 'Text editor' of applicant is equivalent to 'text editor' of Heller.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using a text editor as taught by Heller to revising the failure prediction algorithm by way of a text editor.

For the purpose of using established and reliable technology for editing the prediction algorithm.

Claim 29

Awadallah does not teach pre-processing performance data to provide input data for the failure prediction algorithm.

Heller teaches pre-processing performance data to provide input data for the failure prediction algorithm. (**Heller**, C19:59 through C20:2; 'Pre-processor to provide pre-process performance data' of applicant is equivalent to 'driver/sensor circuitry to gather data' of Heller.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by altering incoming data as taught by Heller to have pre-processing performance data to provide input data for the failure prediction algorithm.

For the purpose of altering incoming data and put it in a form which the invention can use.

Claim 34

Awadallah does not teach means for revising the failure prediction algorithm by way of a text editor.

Heller teaches means for revising the failure prediction algorithm by way of a text editor. (**Heller**, C23:43-48; 'Text editor' of applicant is equivalent to 'text editor' of Heller.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using a text editor

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as taught by Heller to have means for revising the failure prediction algorithm by way of a text editor.

For the purpose of using established and reliable technology for ensuring editing the algorithm correctly.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Awadallah and Preston in view of Heller. (U. S. Patent 4907230, referred to as **Heller**)

Claim 39

Awadallah and Preston do not teach revising the failure prediction algorithm by way of a text editor.

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Heller teaches revising the failure prediction algorithm by way of a text editor. (**Heller**, C23:43-48; 'Text editor' of applicant is equivalent to 'text editor' of Heller.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Awadallah and Preston by using a text editor as taught by Heller to revising the failure prediction algorithm by way of a text editor.

The purpose of using established technology such as a text editor to reduce the learning curve for the invention's use.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 22, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Awadallah in view of Ottesen. (U. S. Patent 6314377, referred to as **Ottesen**)

Claims 4, 22, 33

Awadallah does not teach the machine-readable code is configured to execute on a storage system.

Ottesen teaches the machine-readable code is configured to execute on a storage system. (**Ottesen**, abstract; 'Storage system' of applicant is equivalent to 'drive array' of Ottesen.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by narrowing the scope of the invention to storage devices as taught by Ottesen to have the machine-readable code is configured to execute on a storage system.

For the purpose of using prediction of possible failures to replace or repair storage systems before they fail to avoid loss of information.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Awadallah in view of Jones. (U. S. Patent 6219805, referred to as **Jones**)

### Claim 7

Awadallah teaches a performance monitor to gather performance data for a storage system (**Awadallah**, abstract; 'Performance monitoring' of applicant is equivalent to 'condition monitoring' of Awadallah.); a processor to execute a failure prediction algorithm on the performance data to produce a result, the failure prediction algorithm comprising fuzzy logic rules (**Awadallah**, abstract, p245, C1:18 through C2:21; To run a 'computer simulation' of Awadallah, a processor is assumed. 'Failure prediction algorithm' of applicant is equivalent to 'fault diagnosis and prediction' of Awadallah. 'Fuzzy logic rules' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah.); a determination module to selectively forecast failure of one or more components of the storage system in response to the result. (**Awadallah**, p249, C1:29-48; 'Forecast failure' of applicant is equivalent to 'predicting abnormal operation' of Awadallah.) an interface to adjust (**Awadallah**, p245, C1:18 through C2:21; 'The present of an 'interface' of applicant manifests itself by being able to run 'computer simulations' or 'experimental testing' of Awadallah.) a predefined quality threshold. (**Awadallah**, p248, C2:50 through p259, C1:5)

Awadallah does not teach the determination module in response to user input, thereby adjusting the degree of data loss risk and remedial costs associated with a forecasted failure of one or more components.

Jones teaches the determination module in response to user input, thereby adjusting the degree of data loss risk and remedial costs associated with a forecasted



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failure of one or more components. (Jones, C2:18-31 C4:15-27 and C6:34-48; 'Data loss risk' of applicant is evaluated by the 'risk analyzer' of Jones. 'Remedial cost' of applicant is equivalent to 'expected repair cost' of Jones. 'Adjusting' of applicant is equivalent 'modifying' of Jones.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by balancing lost of information with remedial costs as taught by Jones to have the determination module in response to user input, thereby adjusting the degree of data loss risk and remedial costs associated with a forecasted failure of one or more components.

For the purpose of lowering cost at the risk of not having 100% backup.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 27, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Awadallah in view of Guay. (US Patent 6553369, referred to as **Guay**)

Claim 27

Awadallah does not teach mapping the result to one of a plurality of predefined recommendations.

Guay teaches mapping the result to one of a plurality of predefined recommendations. (**Guay**, C5:62 through C6:8; 'Predefined recommendations' of applicant is equivalent to 'providing recommendations' of Guay.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Awadallah by using predefined recommendations as taught by Guay to have a mapping the result to one of a plurality of predefined recommendations.

For the purpose of using results that are commonly occurring with storage failures

Claim 28

Awadallah does not teach producing a notification in response to the result.

Guay teaches producing a notification in response to the result. (**Guay**, C5:62 through C6:8; 'Producing a notification' of applicant is equivalent to the output of 'providing recommendations' of Guay.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of

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Awadallah by outputting a response as taught by Guay to produce a notification in response to the result.

For the purpose of outputting a response so that a user can use the information which the invention generated.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Awadallah, Preston and Heller in view of Higgens. (U. S. Patent 6397202, referred to as **Higgens**)

Claim 40

Awadallah, Preston and Heller do not teach adding fuzzy logic rules to the failure prediction algorithm.

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Higgins teaches adding fuzzy logic rules to the failure prediction algorithm. (Higgins, C2:31-40; Higgins discloses the addition to existing rules.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Awadallah, Preston and Heller by being able to add additional rules as taught by Higgins to adding fuzzy logic rules to the failure prediction algorithm.

For the purpose of being able to expand the capabilities of the invention.

### ***Response to Arguments***

7. Applicant's arguments filed on April 16, 2007 for claims 1-7, 13, 18-25, 27-40 have been fully considered but are not persuasive.

8. In reference to the Applicant's argument:

#### **RESPONSE TO CLAIM REJECTIONS UNDER 35 U.S.C. § 101**

Claims 1-24 and 30-40 stand rejected under 35 U.S.C. §101 for nonstatutory subject matter. The Examiner's position is that independent claims 1, 7, 13, 18, 30, and 36 each fail to "set forth a practical application of that § 101 judicial exception to produce a real-world result." Applicants respectfully disagree.

"For an invention to be 'useful', it must satisfy the utility requirement of section 101." MPEP §2106 (W)(C)(2)(2)(a). "An invention has a well-established utility if (i) a person of ordinary skill in the art would immediately appreciate why the invention is useful based on the characteristics of the invention... and (ii) the utility is specific, substantial, and credible." MPEP §2107 (II)(A)(3). The tangible requirement dictates that "the process claim must set forth a practical application... to produce a real-world result." MPEP §2106(IW)(C)(2)(2)(b). "In other words, the opposite meaning of 'tangible' is 'abstract.'" *Id.*

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Amended claim 7 discloses "a determination module to selectively forecast failure of one or more components of the storage system." Similarly, amended claim 13 discloses "an analysis module to execute machine-readable code programmed to selectively predict failure of the storage media and the drive mechanism." This language is substantially similar to the language of claim 25, "selectively forecasting failure of one or more components," which the examiner states "discloses enough information to state what the practical application of the invention is." Applicants submit that the language in amended claims 7 and 13 also states what the practical application of the invention is.

Amended claims 1, 18, 30, and 36 disclose generating machine-readable code from a natural language failure prediction algorithm comprising fuzzy logic rules. It is readily apparent to one skilled in the art that an invention that generates machine-readable code from a natural language algorithm would be useful. This ability to generate machine-readable code is specific, substantial, and credible. The real-world result is that the code generator generates machine-readable code. Generating machine-readable code from a natural language algorithm is like voice-recognition software that generates a text file from a series of verbally spoken words. This allows a user that is not familiar with computer programming or machine-readable code to create machine-readable code by entering a natural language algorithm, just like voice-recognition software allows a user that has difficulty typing to create a text file.

The Examiner has not explained his position on why generating machine-readable code does not constitute a useful result. Applicants invite such an explanation if the Examiner chooses to maintain this rejection. Applicants note, that "[T]he transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price... produces a 'useful, concrete and tangible result' ..." *State Street Bank & Trust Co., v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998). The result produced in the present application (a machine-readable code failure prediction algorithm comprising fuzzy logic rules), is at least as useful, concrete and tangible a result as that described in *State Street* (a momentarily fixed share price) above. Applicants respectfully submit that the Examiner should therefore allow claims 1-24 and 30-40 under 35 U.S.C. §101.

Examiner's response:

Being able to forecast failure of one or more components of a storage device falls short of a practical application. As written in the claims and specification, there is no use of this knowledge being employed. For example if a device failed as predicted, then what? It is not clear why the appellant cites cases such as *State Street Bank* when

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the appellant is clearly distinguishing the real world application of dollar amounts and final share prices of State Street from how the appellant's specification discloses the claimed invention can be used only for prediction failure and nothing else. Voice recognition is not mentioned within the specification. Office Action stands.

9. In reference to the Applicant's argument:

**RESPONSE TO CLAIM REJECTIONS UNDER 35 U.S.C. §112**

Claims 3, 21, 26, 32, 37, and 38 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner states that "claim 37 recites the limitation 'fuzzy logic rules B' which is not in the specification," and further that "adjusting a fuzzy variable" from claims 3, 21, 26, 32, and 38 is not described in the specification. Applicants respectfully disagree.

Applicants submit that claim 37 does not recite "fuzzy logic rules B," but that the "B" is a misprint due to OCR software used by the Examiner, as discussed in the telephone interview of April 10, 2007. Claim 37 recites "fuzzy logic rules." Applicants submit that this limitation is supported in the specification in paragraphs 15, 18, 20-22, 50-51, 92-95, and 127.

Examiner's response:

Examiner withdraws the rejection.

10. In reference to the Applicant's argument:

Applicants also submit that "adjusting a fuzzy variable" and the motivation for the adjustment are supported in paragraphs 92-95, and 127 of the specification. Paragraph 95 of the specification states that:

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"if a user is not satisfied with the sensitivity of the failure prediction algorithm. 206 to certain types of temporary or soft errors, a user may adjust 516 one of the fuzzy variable definitions by changing one or more of the configuration parameters that cooperate to define the fuzzy variable. In this manner, a user is able to tune the failure prediction algorithm 206."

Further, paragraph 127 of the specification states that:

"In one embodiment, the machine-readable code 710 includes an interface 311 configured to allow a user to selectively adjust a fuzzy variable definition to tune the failure prediction algorithm 206. For example, the interface 311 may comprise user-adjustable values that define the transition points, which may be the tuples for pairs defining one or more terms of one or more fuzzy variables."

Applicants submit that the description of "adjusting a fuzzy variable" in paragraphs 92-95 and 127 reasonably conveys to one skilled in the relevant art that Applicants had possession of the claimed invention at the time the application was filed. One of reasonable skill in the art would recognize that the words "adjust" and "adjusting" both have the same root and are simply different forms of the same word, and that "adjust a fuzzy variable" in paragraphs 95 and 127 and the accompanying description of the motivation supports "adjusting a fuzzy variable," in claims 3, 21., 26, 32, and 38. Applicants respectfully submit that the Examiner should therefore allow claims 3, 21, 26, 32, 37, and 38 under 35 U.S.C. §112.

Examiner's response:

Examiner withdraws the rejection.

11. In reference to the Applicant's argument:

**RESPONSE TO CLAIM REJECTIONS UNDER 35 U.S.C. §102(b)**  
Claims 7 and 13 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,314,377 to Ottesen et al. (hereinafter "Ottesen"). Applicant respectfully asserts that Ottesen does not teach or suggest all of the elements of claims 7 and 13 in view of the amendments and the following remarks.

"Anticipation under 35 U.S.C. §102 requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention....Whether such art is anticipating is a question of fact." Apple Computer, Inc. v. Articulate Systems, Inc. 234 F.3d 14, 20, 57

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USPQ2d 1057, 1061 (Fed. Cir. 2000). Applicants submit that Ottesen does not disclose each and every limitation of amended claims 7 and 13.

Claim 7 is amended to include "an interface to adjust a predefined quality threshold of the determination module in response to user input." Claim 13 is amended to include "an interface to selectively adjust a fuzzy variable definition." Applicants respectfully submit that Ottesen does not disclose either interface, and does not teach or suggest adjusting a predefined quality threshold or adjusting a fuzzy variable definition.

Applicants further submit that the "fuzzy logic membership" of Ottesen is not equivalent to Applicants' "failure prediction algorithm comprising fuzzy logic rules" of amended claims 7 and 13. Ottesen teaches the use of fuzzy logic membership for arranging drive assemblies to limit vibration, and does not teach fuzzy logic rules. A membership, or set, is not a rule. Fuzzy logic rules are conditional statements that involve fuzzy logic memberships and define relationships between fuzzy logic memberships (a fuzzy logic membership is a fuzzy logic set) as described in paragraphs 96, and 111418 in the specification.

Ottesen teaches failure prevention by limiting vibration, not failure prediction. Ottesen does not disclose a failure prediction algorithm comprising fuzzy log rules, and specifically teaches away from the use of fuzzy logic memberships to determine or predict drive failure or suitability for use. After describing his fuzzy logic membership, Ottesen states:

"It should be noted that the present invention provides a method and system for properly arranging drive assemblies and not for determining whether or not a given drive assembly may be utilized within an array." (Ottesen, C7:55-62, emphasis added).

Amended claims 7 and 13 are specifically directed towards "predicting component failure within a storage system." Predicting component failure within a storage system includes determining whether or not a component, like a drive assembly, may be utilized within a storage system, like an array. Ottesen specifically teaches away from this. Although Ottesen does disclose the use of PFA and DRP failure prediction and data recovery techniques in the Background of the Invention, Ottesen does not disclose the use of fuzzy logic with either technique, and teaches away from its use as described above. Applicants respectfully submit that claims 7 and 13 are allowable over Ottesen under 35 U.S.C. §102.

Examiner's response:

Ottesen is no longer used as a 102(b) reference. Awadallah is used as a 102(a) reference. Regarding claim 1 Per the application specification in ¶0102, 'fuzzy



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logic is based on natural language.' 'Fuzzy logic' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah. The 'user' has access to the system via item 311 in Figure 3. (**Awadallah**, abstract, C17:30-46, Figure 3) 'Generate machine readable code' of applicant is produced by the 'computer simulations' of Awadallah. (**Awadallah**, C7:36 through C8:9, p245, C1:18 through C2:21) 'Test module' of applicant is equivalent to 'training' of Awadallah. (**Awadallah**, p249, C1:20-21) 'Allow revisions' of applicant is equivalent to 'adjust the system parameter set' of Awadallah. (**Awadallah**, p249, C1:29-48) Regarding claim 13, to run a 'computer simulation' of Awadallah, a processor is assumed. A 'controller' of applicant is equivalent to the processor which runs the 'computer simulation.' (**Awadallah**, abstract, p245, C1:18 through C2:21) In order to run a computer simulation or experimental testing there needs to be a medium between the interface and the computer or a 'communication module.' If there wasn't, the information regarding the 'computer simulation' would write itself and run itself without any input. (**Awadallah**, abstract, p245, C1:18 through C2:21) Computers that can generate 'computer simulations' have a mechanism to transfer data to and from a media storage device to a processor due to the fact the processor has little memory to work with at any given time. (**Awadallah**, p245, C1:18 through C2:21) 'Analysis module' of applicant is equivalent to the formula of  $i_d$  at 2sf was an effective index to predict broken bar faults' of Awadallah. (**Awadallah**, p247, C1:21 through C2:6) 'Fuzzy logic' of applicant is equivalent to 'fuzzy and adaptive fuzzy systems' of Awadallah. 'Failure prediction algorithm' of applicant is equivalent to 'fault diagnosis and prediction' of Awadallah. (**Awadallah**, abstract, C17:30-46) 'Adjust a fuzzy variable definition' of

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applicant is equivalent to 'adjust the system parameter set' of Awadallah. (**Awadallah**, p249, C1:29-48) Office Action stands.

12. In reference to the Applicant's argument:

**RESPONSE TO CLAIM REJECTIONS UNDER 35 U.S.C. §103(a)**

Claim 14 stands rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Ottesen and Awadallah, ('Application of AI tools in fault diagnosis of electrical machines and drives - an overview,' hereinafter Awadallah). Claims 1., 2, 3, 4, and 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable in view of Ottesen, Awadallah, and U.S. Patent No. 6,446,081 to Preston (hereinafter Preston). Claims 5, 18-24, and 30-39 stand rejected under 35 U.S.C. §103(a) as being unpatentable in view of Ottesen, Awadallah, Preston, and U.S. Patent No. 4,907,230 to Heller et al. (hereinafter Heller). Claim 40 stands rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Ottesen, Awadallah, Preston, Heller and U.S. Patent No. 6,397,202 to Higgins et al. (hereinafter Higgins). Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Ottesen, and Heller. Claims 15, 26, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Ottesen, Awadallah, and Heller. Claims 16, 17, 27, and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Ottesen, Awadallah, Heller, and U.S. Patent No. 6,553,369 to Guay et al. (hereinafter Guay). Claims 8, 9, and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable in view of Ottesen, Awadallah, Heller, and U.S. Patent No. 6,219,805 to Jones et al. (hereinafter Jones). Claims 11, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Ottesen, Awadallah, Heller, Jones, and Guay.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." MPEP §2143.03. Even if all the claim limitations are taught or suggested, there must be some suggestion or motivation to combine reference teachings. See MPEP § 2142. This suggestion or motivation to combine references must be established by factual findings. "The factual inquiry whether to combine references must be thorough and searching. (quoting *McGinley v. Franklin Sports, Inc.* 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001)). It must be based on objective evidence of record." *In re Lee*, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002). Furthermore, "[an] examiner's conclusory statements that [the court quotes the conclusory statements] do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability..." *In re Lee*, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002).

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## Examiner's response:

Awadallah deals with prediction with failure of electrical devices and drives while Ottesen relates directly to drives. In response to Applicant's argument that there is no suggestion to combine the references, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of references. In re Nomiya, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is not what individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In re Keller, 648 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Sernaker, 702 F.2d 989, 217 USPQ 1 (Fed. Cir. 1983); In re McLaughlin, 170 USPQ 209 (CCPA 1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. In re Bozek, 163 USPQ 545 (CCPA 1969). Office Action stands.

## 13. In reference to the Applicant's argument:

Ottesen

Applicant submits that because each of the Examiner's § 103(a) rejections is based on Ottesen, which does not include the limitation "failure prediction algorithm comprising fuzzy logic rules" as described above, and because independent claims 1, 7, 13, 18, 25, 30, and 36 each include the limitation, that claims 1-6, 9-12, are 15-40 allowable under §103(a).

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Further, Applicants respectfully submit that Ottesen does not teach "an editor configured to assist a user in generating a failure prediction algorithm comprising fuzzy logic rules, the failure prediction algorithm stored in a human-readable natural language format" of amended claim 1. Ottesen teaches a graphical user interface where "the user is able to develop and verify an optimal strategy for arranging drive assemblies." (Ottesen C4:53-55) Ottesen's strategy for arranging drive assemblies is not a failure prediction algorithm, does not comprise fuzzy logic rules, and Ottesen does not teach storing his strategy in either human-readable or natural language.

The Office Action also states that Ottesen teaches that the "test module is further configured to tune the failure prediction algorithm by adjusting a fuzzy variable definition" with regards to claim 3, without a reference to Ottesen (Office Action, pg 11). Applicants respectfully submit that this teaching cannot be found in Ottesen.

Examiner's response:

Ottesen is now only used to relate the failure to computer hard drives. Office

Action stands.

14. In reference to the Applicant's argument:

Awadallah

The Office Action states that Awadallah's "adjust[ing] the system parameter set" teaches "an interface to selectively adjust a fuzzy variable definition to tune the failure prediction algorithm" of original claim 14, "a revision module configured to allow revisions of the failure prediction algorithm such that the result corresponds to an expected result" of original claim 1, and similar references in original claims 2-6, 11-12, 15-24, and 26-40. Applicants respectfully disagree.

Applicants submit that based on the amendments to claims 1., 1.3, and the other claims mentioned above, particularly in adding "in response to user input," that Awadallah does not teach the interface or the revision module. The full sentence in Awadallah states "adaptive fuzzy systems utilize the learning capabilities of ANNs or the optimization strength of genetic algorithms to adjust the system parameter set in order to enhance the intelligent system's performance based on a priori knowledge." (Awadallah p249 C1:29-48). Applicants respectfully submit that Awadallah does not teach adjusting a fuzzy variable or a failure prediction algorithm in response to user

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input, only in response to artificial neural networks and genetic algorithms, both of which are unrelated to the present invention.

Examiner's response:

'Adjust a fuzzy variable definition' of applicant is equivalent to 'adjust the system parameter set' of Awadallah. (**Awadallah**, p249, C1:29-48) Awadallah teaches fault diagnosis and prediction using computer simulations or experimental test. Office Action stands.

15. In reference to the Applicant's argument:

Preston

The Office Action states that Preston teaches a "code generator configured to generate machine-readable code from the stored failure prediction algorithm" of original claim 1, "linguistic variables having less than four terms" of original claims 2, 19, and 20, and similar language in original claims 3-6, 18-24, and 30-40. Applicants respectfully disagree.

The Office Action refers to C2:46-51 of Preston as teaching a "code generator configured to generate machine-readable code from the stored failure prediction algorithm" of original claim 1. The referenced section, however, teaches a code generator that generates a computer program from a "graphical representation." Amended claim 1 and subsequent claims clarify that "the failure prediction algorithm [is] stored in a natural language format," not as a graphical representation. Applicant further submits that Preston does not teach limiting the use of linguistic variables to less than four terms, and does not recommend a suggested number of linguistic variables to use.

Examiner's response:

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The conversation of any computer language including one in a 'natural language format' into machine language or code occurs in all computers which is used to process a computer language input. It does not matter if the code is used to predict failures or to interpret graphical representation. The claim states the generation of (machine) code which Preston does. Office Action stands.

16. In reference to the Applicant's argument:

Heller

The Office Action states that Heller teaches "the revision module comprises a text editor configured to revise the failure prediction algorithm" of original claim 5, "testing the machine-readable code to produce a result" of original claim 18, and similar teachings in original claims 8-10, and 16-40. The elements are also found in additional claims. Applicants respectfully disagree.

Heller teaches the use of a text editor "to view, create, or edit a source code." (Heller C23:43-48). Heller does not teach the use of a text editor to "revise the failure prediction algorithm" that is stored not as source code, but in a "natural language format," according to amended claim 1.

Applicant submits that Heller does not teach the testing of machine-readable code. Heller teaches the testing of printed circuit boards and their components. The Office Action suggests that this teaching is found in Heller's abstract stating that output from sensors is being integrated into a host microcomputer to produce test results. Heller is teaching the use of a microcomputer, and likely machine-readable code, to produce test results, but does not teach the testing of machine-readable code.

Examiner's response:

Heller is not used in claim 1. 'Testing of machine-readable code' is not mentioned in the claims. This implies that the code itself is being tested for flaws or errors. 'Testing the machine-readable code to produce a result' is disclosed in

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Awadallah. (Awadallah, p245, C1:18 through C2:21; 'Testing' of applicant is equivalent to 'experimental testing' of Awadallah.) Office Action stands.

17. In reference to the Applicant's argument:

Higgins

The Office Action states that Higgins teaches "adding fuzzy logic rules to the failure prediction algorithm" of original claim 40. Applicants respectfully disagree. Higgins, in a reference to another patent, mentions the use of a fuzzy logic expression that "generates rules... so as to add the rules to the rules related to the unmeasurable events." Applicants submit that Higgins teaches the use of fuzzy logic to generate rules, but does not teach the use or the addition of fuzzy logic rules.

Examiner's response:

The Examiner views the generation of rules from fuzzy logic as 'fuzzy logic rules.'

Applicant states that using fuzzy logic to generate rules are different than 'fuzzy logic rules' but fails to state how they are different. Office Action stands.

18. In reference to the Applicant's argument:

Guay

The Office Action states that Guay teaches the "determination module configured to map a result from the failure prediction algorithm to one of a plurality of predefined recommendations" of original claim 16, and similar teachings of original claims 11-12, 17, and 27-28. Applicants respectfully disagree. In the passage cited in the Office Action (Guay C5:62-C6:6), Guay teaches "providing recommendations about attributes of the environment in which the administrative functions are performed to improve performing the administrative functions." Applicants submit that this is wholly unrelated to mapping the result of a failure prediction algorithm to a recommendation, and that Guay does not teach the mapping of original claim 16.

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Examiner's response:

'Data loss risk' of applicant is evaluated by the 'risk analyzer' of Jones.

'Remedial cost' of applicant is equivalent to 'expected repair cost' of Jones. (**Jones**, C2:18-31 and C6:34-48) Both the 'risk analyzer' and 'expected repair cost' of Jones are viewed as functions of the 'determination module' of applicant. Office Action stands.

19. In reference to the Applicant's argument:

Jones

The Office Action states that Jones teaches the "determination module to adjust the degree of data loss risk and remedial costs associated with a forecasted failure of one or more components" of original claim 8, now included in amended claim. 7 and similar teachings in original claims 9-10. Applicants respectfully disagree. The determination module of original claims 7 and 8 clearly deals with "components of the storage system" (emphasis added). Jones, however, teaches a risk assessment system for "components of a software system." (Jones C1:60-63). Further, Jones does not teach adjusting the degree of data loss risk and remedial costs, just estimating it.

Examiner's response:

'Data loss risk' of applicant is evaluated by the 'risk analyzer' of Jones.

'Remedial cost' of applicant is equivalent to 'expected repair cost' of Jones. (**Jones**, C2:18-31 and C6:34-48) 'Adjusting' of applicant is equivalent 'modifying' of Jones. (**Jones**, C4:15-27) Jones is used in connection with Awadallah, which is specific regarding hardware systems. Office Action stands.

20. In reference to the Applicant's argument:



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Appellants respectfully assert that if the prior art of record so clearly demonstrates the obviousness of the claimed invention, a single reference would teach more than just one or two elements of the claimed invention. However, the formation of the combinations used in the rejections is indicative of impermissible hindsight analysis by the Examiner. The sheer number of references used seems to indicate that the claim terms were used in a key word search of the prior art. For certain claims up to five different references are relied upon. Once a key word hit was found, there appears to be little analysis performed to determine the applicability of relevance of the reference. The four references cited regarding the relatively brief original claim 8, broken up in groups of a few words each is indicative of hindsight keyword analysis in support of a 103 obviousness rejection. Appellants respectfully assert that because such analysis is improper the rejections should be overturned.

Given that Ottesen, Awadallah, Preston, Heller, Higgins, Guay, and Jones fail to teach or suggest all of the elements recited in independent claims 1, 7, 13, 18, 25, 30, and 36 of the present application, Applicants respectfully submit that independent claims 1, 7, 13, 18, 25, 30, and 36 are patentable over Ottesen, Awadallah, Preston, Heller, Higgins, Guay, and Jones. Applicants also request that the rejection of claims 1, 18, 25, 30, and 36 under 35 U.S.C. §103(a) as being unpatentable over Ottesen, Awadallah, Preston, Heller, Higgins, Guay, and Jones be withdrawn. Applicants further request that the rejection of claims 7 and 13 under 35 U.S.C. §102(b) as being unpatentable over Ottesen be withdrawn. Given that dependent claims 2-6 depend from claim 1, that dependent claims 9-12 depend from claim 7, that dependent claims 15-17 depend from claim 13, that dependent claims 19-24 depend from claim 18, that dependent claims 27-29 depend from claim 25, that dependent claims 31-35 depend from claim 30, and that dependent claims 37-40 depend from claim 36, Applicants respectfully submit that Claims 2-6, 9-12, 15-17, 19-24, 27-29, 31-35 and 37-40 are also patentable over Ottesen, Awadallah, Preston, Heller, Higgins, Guay, and Jones and request that their rejection under 35 U.S.C. § 103(a) as being unpatentable over Ottesen, Awadallah, Preston, Heller, Higgins, Guay, and Jones also be withdrawn.

#### Examiner's response:

In response to Applicant's argument that there is no suggestion to combine the references, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of references. In re Nomiya, 184 USPQ 607 (CCPA 1975).

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However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is not what individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In re Keller, 648 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Sernaker, 702 F.2d 989, 217 USPQ 1 (Fed. Cir. 1983); In re McLaughlin, 170 USPQ 209 (CCPA 1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. In re Bozek, 163 USPQ 545 (CCPA 1969).

### ***Examination Considerations***

21. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has the full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

22. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and sprit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

23. Examiner's Opinion: Paragraphs 21 and 22 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

### ***Conclusion***

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

25. Claims 1-7, 13, 18-25, 27-40 are rejected.

### ***Correspondence Information***

26. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3080. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

Receptionist,

Customer Service Window,

Randolph Building,

401 Dulany Street,

Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

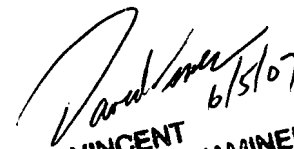
(571) 272-3150 (for formal communications intended for entry.)

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



Peter Coughlan

6/5/2007



6/5/07  
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